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Executive Registry

December 4, 1982

82-13326

## MEMORANDUM FOR

NSC Review Completed as Redacted.

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for National Security Affairs

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Office of Management and Budget

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Department of the Treasury

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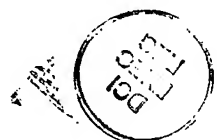
Mr. William V. Vitale  
Director, Office of the Executive  
Secretariat  
Department of Energy

SUBJECT: NSC Meeting on Alternative Energy, December 7, 1982 (C)

A National Security Council meeting has been scheduled for 2 p.m., Tuesday, December 7, 1982, in the Cabinet Room to discuss alternative energy. (C)

The following issues paper has been prepared by the NSC staff in an effort to provide the President with a status report on East-West energy security activities in preparation for the December 7, 1982 NSC discussion on alternative energy. Attached you will also find a summary from Don Regan on the SIG-IEP discussion on these issues. In preparing this paper, we have drawn on the conclusions of that meeting, as well as the preliminary discussions on the follow-up

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on the energy studies in the "Summary of Conclusion" on East-West economic relations. The objective of the meeting is to bring together the various elements into a coordinated strategy to reduce European dependency on Soviet energy. These will be the only documents circulated for the meeting, although background papers on these issues were distributed for the November 29, 1982 SIG-IEP. Copies of these papers are available on request from my office. (S)

*Dona S. Noe*  
Michael O. Wheeler  
Staff Secretary

## Attachments

Tab A Issues Paper  
Tab B Summary of SIG-IEP Discussion

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SECRETAlternative Energy Issues Paper (U)Issues

1. What is the potential market share of Soviet gas in European gas markets over the next two decades? What does this imply for European security and Soviet hard currency earnings? To what extent can the Soviet Union block development of non-Soviet alternatives? (C)

2. How can we achieve the NSDD-66 energy objective that European countries "will not commit to any incremental deliveries of Soviet gas beyond the amounts contracted for from the first strand of the Siberian pipeline; not commit themselves to significant incremental deliveries through existing pipeline capacity; and participate in the accelerated development of alternative Western energy resources, principally Norwegian gas reserves." (S)

3. What actions can we take domestically to contribute to a better world energy picture and gain credibility abroad in our negotiations on limiting European dependence on Soviet energy? (C)

Discussion and Background

1. European Gas Markets and the Role of Soviet Gas and non-Soviet Alternatives. CIA studies show that the Soviets can capture a significant part of the European gas market with only one strand and fuller use of existing pipeline capacity. Alternatives, such as Norway's giant Troll field, are more expensive, have longer lead times and are technically challenging. The Soviet Union can be expected to aggressively seek Western customers offering lower than market prices and lucrative equipment sales contracts. By limiting gas purchases to a one strand pipeline, total hard currency earnings can be contained to around \$10 billion annually, compared with twice that from a two strand/full capacity system. (For comparison, 1981 Soviet hard currency imports totalled \$26 billion.) (S)

2. International Measures to Reduce Allied Dependency on the Soviet Union and Achieve the NSDD-66 Objectives. The NSDD-66 energy objective will be difficult to negotiate. The Europeans will emphasize energy dependency as a whole and their need for Soviet gas to diversify away from Middle East oil. They will equate projected gas from present Soviet gas contracts with Dutch surge capacity and conclude that there is no security threat from increasing Soviet dependency. The United States should focus on natural gas markets and the need to preserve market share for large-scale alternatives such as Troll. We should point out the Soviet's ability to become the marginal supplier of gas to Europe and the negative impact this would have on large-scale alternatives. On gas security, we should insist on rigorous analytical study of the physical nature of the European grid and the ability to move gas to troubled areas in times of disruption (i.e. ability to

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transport gas to highly Soviet gas dependent regions such as Bavaria). (S)

While the Europeans will want to depend on general and global type analyses which gloss over the security problem, we should insist that these studies be country and sector specific on the demand side. On the supply side, we should emphasize the engineering and operational requirements and constraints of major alternatives, with a focus on Norwegian gas. This approach will be more of an effort than the energy studies prepared for past Economic Summits and IEA Ministerial meetings. More detail, however, serves our purposes. (C)

Our process should be threefold:

-- Strongly support the IEA natural gas security study with a Ministerial review of the progress in late spring 1983. (U)

-- Convene a Summit energy working group (if possible, as early as December 15 in Paris) which would include the Norwegians and Dutch to undertake the energy study in the "Summary of Conclusions." This study should review regional and country specific energy requirements, import dependencies, vulnerabilities to oil and gas disruptions and alternatives to reduce security risks. (S)

-- Continue USG studies in these areas and at the appropriate time share sanitized versions with our Allies and the IEA Secretariat. (C)

These three efforts should complement and reinforce one another and lead to at least a preliminary assessment by the time of the Williamsburg Summit. It will be difficult for the Europeans to admit publicly to no more Soviet contracts. However, we may be able to build on the present Germany commitment to limit Soviet gas to 30% of their total gas requirements. If future gas demand is low, as we expect, this implies commitment to only a one strand Siberian pipeline. This, coupled with an allied agreement to accelerate the development of Norway's Troll field to meet incremental European gas demand in the 1990's, would preclude construction of the second strand of the Siberian gas pipeline project or significant incremental deliveries through existing Soviet pipelines. This commitment should be our bottom line. Anything less will not satisfy the objectives of NSDD-66. (S)

3. Domestic Energy Recommendations. Our international approach would be complemented and strengthened if the United States took some important domestic steps to improve the global energy picture. U.S. energy exports cannot substitute for Soviet gas; however, by continuing the Administration's free market energy philosophy, we can improve the long-term energy future of all countries and increase our credibility in the negotiations on energy security. The Cabinet Council on Natural Resources and the Environment is giving consideration to the following measures:

-- Deregulation of Natural Gas Prices. This is our most important option to increase U.S. credibility abroad. (S)

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-- Partially lift the ban on Alaskan oil exports to Japan and/or encourage the Japanese to invest in new Alaskan resources, permitting them to export the oil they develop. This makes good sense from an economic perspective and could be an important signal of U.S. free trade promotion at a time when protectionist tendencies are threatening the world trading system. However, it will be difficult to achieve politically unless the Japanese are willing to make some economic and security concessions. There are indications that Japan is receptive to this approach. (The Cabinet Council on Natural Resources and the Environment has concluded that the SIG-IEP should take the lead in developing this issue. Discussions on this issue are only at a very preliminary level and, as the topic is very sensitive on the Hill and in Japan, it is important that the topic be handled with discretion.) (S)

-- Improve competitiveness of U.S. coal exports. Actions, such as assigning a high priority to obtaining the Administration's port user fee legislation to facilitate dredging of U.S. coal ports, would demonstrate our commitment to coal as an alternative energy source. (C)

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THE SECRETARY OF THE TREASURY  
WASHINGTON

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November 30, 1982

MEMORANDUM FOR THE HONORABLE  
WILLIAM P. CLARK  
ASSISTANT TO THE PRESIDENT FOR  
NATIONAL SECURITY AFFAIRSFROM: Donald T. Regan *DR*  
SUBJECT: Summary of SIG-IEP Alternative Energy Discussion

As requested in your memorandum of October 14, I would like to give you a report on the SIG-IEP discussions on reducing Allied dependency on Soviet energy. The Group is agreed that the Soviets can capture a significant part of the European gas market beyond that contemplated for one Siberian strand. Alternatives, such as Norway's Troll field, are more expensive, have longer lead time and are technically challenging. Given the potential to reap hard currency earnings from gas which are comparable to their total payments for hard currency imports last year, the Soviet Union will have every incentive to offer low prices and lucrative equipment contracts to gain a greater share of the European gas market. Against this setting, the SIG-IEP strongly supports the recommendations of the International Energy Security Group that we urge our Allies to limit their gas purchases and to accelerate alternatives, particularly the Troll field. To carry out this objective, the International Energy Agency should be urged to complete its natural gas security study in a timely manner. This effort, coupled with the Allied energy studies called for in the Summary of Conclusions of the East-West accord, should provide the technical underpinnings for a political commitment to reduce dependency on Soviet energy by the time of the Williamsburg Summit. I think that it would also be useful if the very sobering analysis prepared by the CIA on Western European Gas Markets and Alternatives could be sanitized and shared with our Allies. The SIG-IEP will continue to monitor carefully the various energy studies and consultations with our Allies as is directed in NSDD-66.

The International Energy Security Group also recommended a number of domestic measures, many of which make good economic sense domestically as well as internationally. The SIG-IEP gave a firm vote of approval to the proposal to phase

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in complete decontrol of natural gas by 1985. They were also sympathetic to the suggestions to increase energy exports -- such as coal -- as a means to improve U.S. trade balances over the longer term. While these actions are not short-term remedies to the problem of Soviet gas dependency, they can improve world energy markets over the longer term, and they would most certainly give a boost to our credibility in future negotiations with the Allies who have from the start urged us to get our own house in order before lecturing to them about gas security.

We had a very good preliminary discussion on Alaskan oil export to Japan. I found no serious objection to pursuing this idea, so I have asked Allen Wallis to convene a small working group on the issue. I hope that we can provide a proposal for your consideration early next year.

The discussion revealed continuing Cabinet interest in the issue of finding solutions to ever-increasing European reliance on Soviet energy. But the road ahead with our Allies is likely to be a difficult one. With one foot in the door, the Soviets can become the marginal supplier of gas to Europe. The burden is now on the alternate suppliers who face higher costs and more technically challenging projects. Our actions at home can improve world markets over the longer term and increase our credibility, but they are not short-term fixes. The real answer lies in development of the giant Troll field in Norway. Development of this field will preclude further reliance on Soviet gas until well into the next century. It is here where we should put our emphasis in talks with the Allies over the coming months.

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How to Encourage Norwegian Gas Production?

## 1. There appears to be general agreement on the following:

- o West European gas demand will increase enough by the mid- to late-1990s to require some large new import sources.
- o The Soviets have ample resources to meet this potential demand and have strong incentives to do so.
- o Norway probably has enough resources to cover most of the increase in European demand.
- o Whether or not Norwegian gas development can be profitable is uncertain, depending heavily on the future price of oil, and partly on the seriousness of the technical problems in exploiting the gas.
- o Low production costs and acceptance of low rates of return on investment make it possible for the Soviets to price their gas attractively even if prices should fall substantially.

2. West Europeans do not intend to make any large additional commitments for Soviet gas, and certainly not to build a new pipeline, for at least some time. They are unlikely to become interested in new Soviet gas projects until a clear upward trend in gas demand has become clear, and this will probably not happen for several years. Although they will assert that they have no intention of buying more Soviet gas, they are highly unlikely to make any firm long-term commitments not to do so. Indeed, although Ambassador Galbraith's assessment of the problem is excellent, I do not believe that his recommended solution--to seek an Allied commitment not to buy Soviet gas--is the way to go.

3. The West Europeans would be far more likely to make a commitment to buy Norwegian gas. In the near term, only a very general policy statement favoring Norwegian gas would be feasible because of the many uncertainties about technical problems, cost, and even the size of reserves of Norwegian gas. Even a general statement, however, might encourage the Norwegians to proceed with more intensive exploration, testing, and in some fields, the early stages of development.

4. In the meantime, beyond the general studies already planned, a detailed analysis of the technical, institutional, and political constraints on and incentives for development of Norwegian gas fields, should be undertaken. This analysis will require a great deal of additional information; it should consider, among other things:

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- o A more precise assessment of the technical problems and possibilities for developing the Troll field--requiring accelerated exploration, testing, and engineering work.
- o More intensive exploration of the Northern fields so as to get a better fix on the size of reserves in that area.
- o Specific identification and assessment of Norwegian regulatory and tax instruments and their impact on North Sea gas exploration and development.
- o Exploration of the Norwegian interests in developing the Northern fields partly for security reasons--to help prevent the depopulation of the Northern-most provinces--and of Sweden's economic interest in purchasing Northern gas.
- o Further exploration of the impact of UK gas policies and regulations and how these might be changed to facilitate accelerated development of Norwegian gas.

5. In addition to detailed studies along the above lines, development of Norwegian gas could be aided by steps to make Norway a participant in some of the major Allied discussions of East-West economic issues and by measures designed to create a more unified West European gas market. If a European Community natural gas group were formed, and if the UK were willing to join it, it would become easier for the Europeans eventually to make firm commitments to purchase Norwegian gas. In this connection, construction of a gas pipeline connecting the UK with the Continent would be very helpful. The British are unwilling to be net exporters of gas (because they want to protect their reserves) but are willing to act as a corridor to the Continent for Norwegian gas.

6. The US should avoid a high profile in its efforts to encourage development of Norwegian gas. The Norwegians do not want to make it appear that they are accommodating US wishes; they have reasons of their own for wanting to develop their gas resources, including assuring an adequate export market, and developing the North. The other West Europeans probably will seek Norwegian gas for their own reasons as well. They do not want to be heavily dependent on Soviet gas and would prefer to buy from Norway instead. Moreover, they do not want to make the sort of commitment that would give Norway strong leverage on price terms.

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Talking Points on Astrakhan

1. With the Yamal project well in hand, the Soviets in recent months have given the Astrakhan project top priority among cooperative energy projects with Western Europe.

- o The potential output from this project could equal 10 percent of current Soviet gas production.
- o A great deal of sulphur would also be produced as a byproduct.
- o The gas would be used mainly to offset depletion of older fields in the Southern USSR.
- o Development of the gas is difficult because of the prevalence of corrosive and hazardous chemicals and the depth of the deposits.
- o It requires a great deal of Western pipe and equipment, worth some one and a half billion dollars.

2. Western bidding for equipment contracts has become a severe test of Allied willingness to cooperate on East-West economic issues.

- o French, Canadian, Japanese, Germany, Italian, U.K., and Austrian firms are competing for contracts.
- o The Soviets are insisting on below market (7.8 percent) interest rates, and are skillfully playing the bidders against each other.
- o Soviet tactics are having an effect: in an effort to win contracts, Canada and France reportedly are considering "grandfathering" the interest rate to 1981 or earlier, on the grounds that negotiations were well along at that time.
- o The French may claim that their financial protocol with the USSR commits them to do this, even though all the evidence is to the contrary.
- o These pressures indicate a high risk that the OECD agreement on a consensus rate of 12.4 percent will be breached. The decline in market interest rates adds to the pressure.

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I. European Gas Demand and Alternatives to Siberian Gas

A. Although West European demand for gas has softened in recent years, the falloff is expected to bottom out this year and demand to revive as economic recovery begins.

1. CIA estimates that demand for gas in Western Europe will increase from about 3.6 million barrels per day oil equivalent (b/doe) in 1980 to about 4.1 million b/doe in 1990 and to 4.5-5.0 million b/doe by the year 2000.
2. As domestic West European supplies of gas are depleted or shut in, the import dependence of the region will rise--from 13 percent currently to about 50 percent by the turn of the century.
3. Provided some new deliveries of Soviet gas begin in the late 1980s, West European countries expect to be able to meet projected demand through 1990 from supplies they have already lined up.
  - West Germany and France have signed contracts, including those for Soviet gas, that will probably give them access to more gas than they will use in the 1980s.
  - Italy is expected soon to finalize negotiations with Algeria and the Soviet Union to fulfill gas requirements for the 1980s.
4. For the 1990s, however, West European countries will have to line up new supplies of 1.2 to 1.3 million b/doe.

5. The Soviets are anxious to increase gas exports to Western Europe and, with the completion of the Siberian gas pipeline, could more than double current sales by 1990.

-- The Soviet Union is currently delivering about 430,000 b/doe of gas to Western Europe.

-- Total Soviet gas exports to Western Europe in the late 1980s could be about 900,000 b/doe, about 25 percent of West European gas requirements and 3 percent of total energy needs.

6. If the West Europeans were to forego increases in Soviet gas deliveries because of sanctions or unforeseen political events, they could technically balance supply and demand through the decade. However, the economic and political decisions necessary to bring about this combination of events would require a major reversal of existing policies.

-- Increased production of Dutch gas would be needed.

-- Development of Norway's Sleipner field would have to be accelerated.

-- Domestic production in France, West Germany, and Italy would have to be sustained or increased from present levels.

-- Gas consumption would probably have to fall below present expectations.

B. Maximizing non-Soviet supplies in the 1990s will depend on Western Europe's assessment of the relative costs of alternative gas supplies and their concerns over security and diversification of supplies.

1. Norwegian gas offers a secure but costly alternative to Soviet gas in the 1990s.

--Norway could supply an additional 670,000 to 830,000 b/d oil equivalent, which would cover the bulk of the increase projected for West European demand in the 1990s.

--Deliveries from the Block 31/2 (Troll) field in the North Sea could reach 500,000 to 670,000 b/d oil equivalent by the late-1990s.

- o New technologies must be developed to exploit the field, which lies in very deep water and contains a thin oil layer that could delay development.

- o It would cost \$15-20 billion to develop and deliver 500,000 b/d of gas directly to the continent.

-- Another area for potential development is the Tromsa area off the northern coast of Norway.

- o Recent discoveries indicate a large reserve potential, but simultaneous development of Tromsa and Troll is unlikely and transportation of gas from Tromsa is likely to be very expensive.

- Norway's Sleipner area--with reserves of about 8 trillion cubic feet--offers the greatest potential for development in the near term.
- 2. The United Kingdom is not likely to become a net exporter of gas, but could play a key role in a gas swap arrangement with Norway.
  - If such a triangular deal could be arranged with Norwegian gas from Sleipner going to the UK in exchange for UK gas to the continent, 170,000 to 250,000 b/d oil equivalent could be delivered in the early 1990s.
  - Development and pipeline construction costs could total about \$6 billion.
- 3. West European importers' most reliable and economical source of additional gas would be the Netherlands, currently Western Europe's largest gas supplier.
  - Unless the current conservation policies of the Hague change, however, the amount of Dutch gas available for export in the late 1990s will dwindle to less than one-fourth its present volume.
  - Falling gas sales and Dutch needs for funds are pressing the Hague to reconsider its export policies; at most, the Dutch probably would increase sales by about 150,000 to 200,000 b/d oil equivalent for a few years.
  - Some Dutch officials have expressed a willingness to provide more gas in the near term if they could

obtain gas from other countries later; high level discussions between Dutch and Norwegian officials on such an arrangement have probably not taken place, but the Dutch have made a preliminary study of the technical feasibility of such cooperation.

Differences in the heat value of Dutch and Norwegian gas could seriously complicate such an arrangement.

4. Gas production on the European continent is expected to decline over the next two decades. Intensified exploratory drilling, particularly in Italy, might slow the expected decline but probably will not yield large additional supplies for Europe.

5. West European imports of LNG from Nigeria, Cameroon, Qatar, or other sources could total 150,000 b/d oil equivalent but would be very costly and pose security risks.

-- Nigeria's Bonny LNG project will probably be restructured at half the original size but will not be complete until the early 1990s.

-- Qatar could supply sizable quantities of gas in the mid to late 1990s but transportation costs would be very high.

6. Gas imports from North Africa or the Middle East via pipeline could offer a more economical alternative than LNG imports, but may be politically undesirable.

-- Additional gas could be delivered in the mid-1990s through existing pipelines from Algeria to Italy,

and up to 250,000 b/doe through a new pipeline to Spain. Likely gas export shortfalls for the remainder of this decade, however, could discourage buyers from taking additional supplies in later years.

-- The proposed Iranian gas pipeline to Europe via Turkey, while feasible, would take at least five years to complete, would be costly, and could pose serious security risks.

-- Other proposed pipelines from the Middle East are probably neither economically nor politically feasible.

7. US coal could provide some additional energy supplies to Western Europe by 1990 but volumes are likely to be small.

-- Western Europe already has ambitious plans to use coal and would need to expand coal handling capabilities even further.

-- Some type of subsidy would probably be needed to encourage greater use of coal in industry.

C. Although steps are being taken to expand gas storage capacity in Western Europe, growing dependence on imported gas in the late 1980s will increase vulnerability to disruptions.

1. By 1990, gas supplies subject to disruption (from Algeria, Libya, and the Soviet Union) could supply almost 40 percent of overall gas demand in Western Europe and an even higher percentage in France and Italy.



2. The seasonal nature of gas demand will tend to magnify the potential impact of a disruption.
3. Potential Dutch surge capacity over existing production levels is estimated to be 1.7 million b/doe, sustainable for one year.
4. Plans call for gas storage capacity to be increased more than 50 percent by the mid 1980s.
  - Current storage capacity is the equivalent of only 35 days average 1981 consumption.
  - Much of the storage capacity will be required to meet peak seasonal demand.

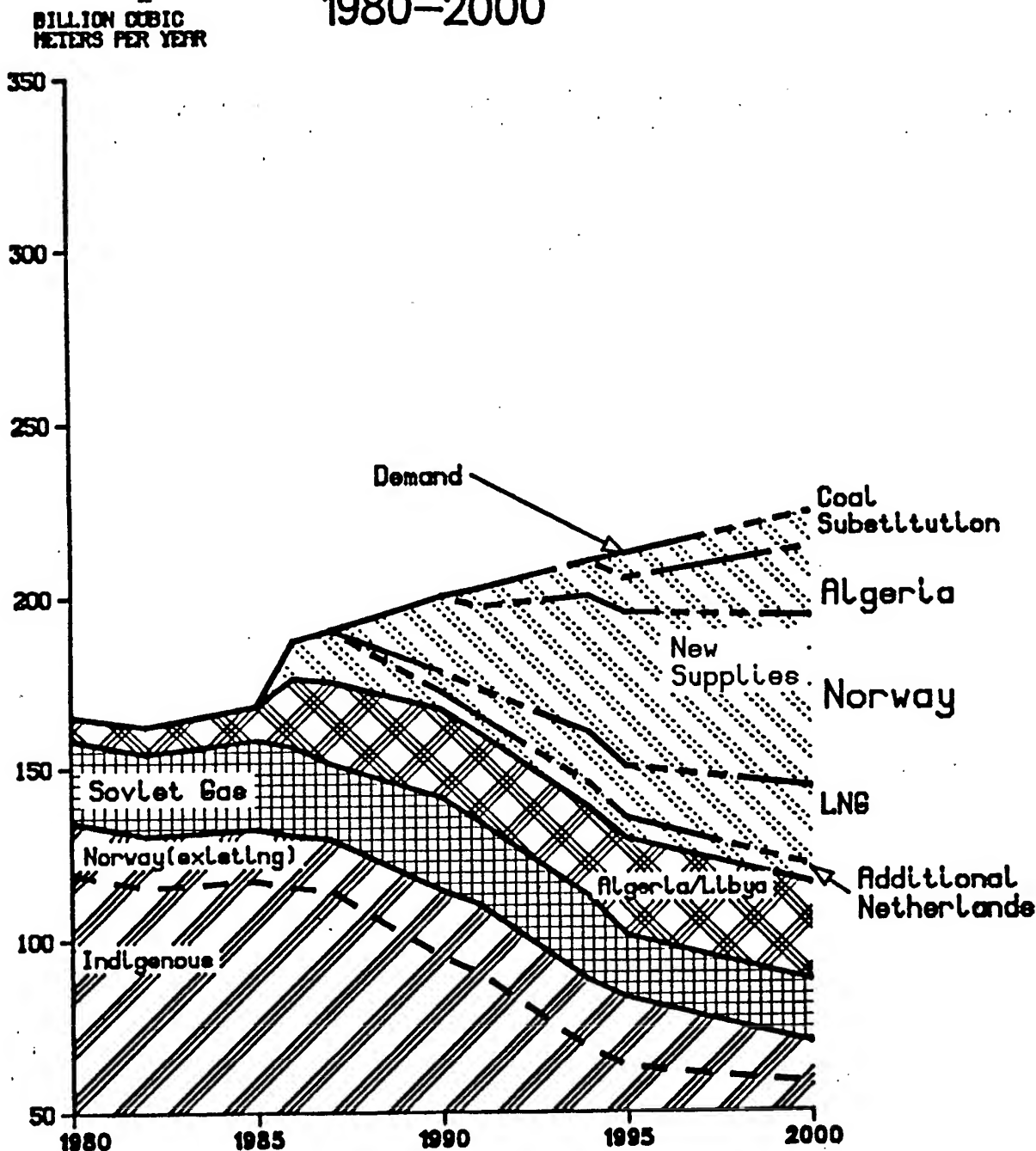
# Case I

## (European Gas Supplies without Siberian Gas)

- o This graph shows declining indigenous production particularly after 1985 as West European gas supplies are depleted or shut in.
  - By 1990, indigenous production would approximate 85 billion cubic meters (bcm), falling to almost 58 bcm by the year 2000.
  - Existing Norwegian production is then shown at about 20 bcm in 1990, falling to 12 bcm by 2000.
  - Existing Soviet production follows at 26 bcm in 1990 and 18 bcm by 2000.
  - North African gas will provide approximately 26 bcm in both 1990 and 2000.
- o A supply shortfall begins to emerge after 1985 increasing thereafter by considerable proportions as potential supplies fail to meet projected demand. With demand at 200 bcm, the shortfall will be about 43 bcm in 1990. The gap widens to 112 bcm in 2000 when demand reaches 226 bcm.
- o Without Siberian gas, Norwegian gas coupled with Algerian gas, US coal, some LNG and a slower rate of the phase out of Dutch exports could theoretically balance supply and demand. However, the economic and political decisions necessary to bring about this combination of events would require a major reversal of existing policies within the next few years, which does not appear likely.
  - Norway is reluctant to speed up development because of concerns over the impact it would have on the domestic economy. Consumers may be unwilling to pay the high prices demanded by the Norwegians for new gas contracts. In addition, private companies may be unable to finance major gas development projects.
  - Algeria's militant pricing policy and its unilateral suspension of gas deliveries to France and the United States in 1980 make it a high-priced and potentially unreliable supplier.

- The US can provide some additional coal by 1990 but volumes are likely to be small. Western Europe already has ambitious plans to use coal and would need to expand coal hauling capabilities even further. Some type of subsidy would probably be needed to encourage greater industrial coal use.
- LNG from North Africa or other sources would be very costly.
- Without a change in the current conservation policies of the Hague, the amount of Dutch gas available for export in the late 1990s will dwindle to less than one-fourth its present volume.

# Continental Europe: Natural Gas Supply and Demand Forecast 1980-2000



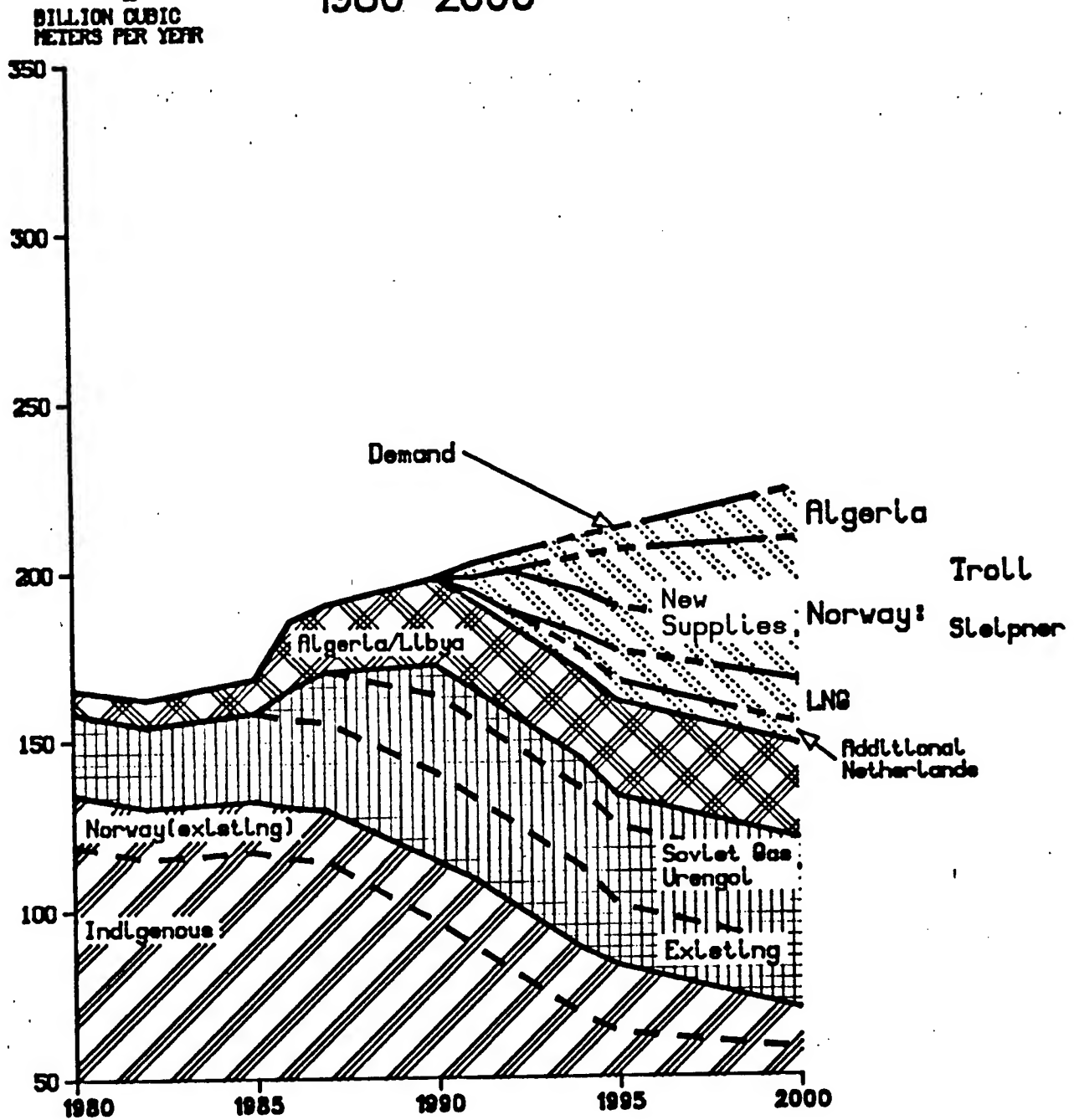
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Case II

(European Gas Supplies with Siberian Gas, only One Strand)

- o This graph assumes that the Siberian pipeline is completed and that no new gas contracts beyond those presently being contemplated are agreed to.
- o Siberian gas purchases will probably provide 23 bcm (minimum) or 32 bcm (maximum) in both 1990 and 2000, supplementing existing Soviet gas supplies which will steadily decline from about 26 bcm in 1990 to almost 18 bcm in 2000.
- o Although Siberian gas will not eliminate the prospect of a supply shortfall which will likely occur in the late 1980s, it will minimize the potential magnitude of the shortfall. Assuming minimum purchases of Siberian gas, the shortfall is likely to be about 32 bcm in 1990 and 63 bcm in 2000. With maximum purchases the shortfall would probably approximate 23 bcm in 1990 and 80 bcm in 2000.
- o In this case, substantial volumes of additional gas from Norway and Algeria will not be needed until the mid 1990s. This cushion could provide the Norwegians the lead time required to bring major gas projects on line.

# Continental Europe: Natural Gas Supply and Demand Forecast 1980-2000



Case II:  
Limitation of Soviet  
Gas to Existing Contracts

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Case III

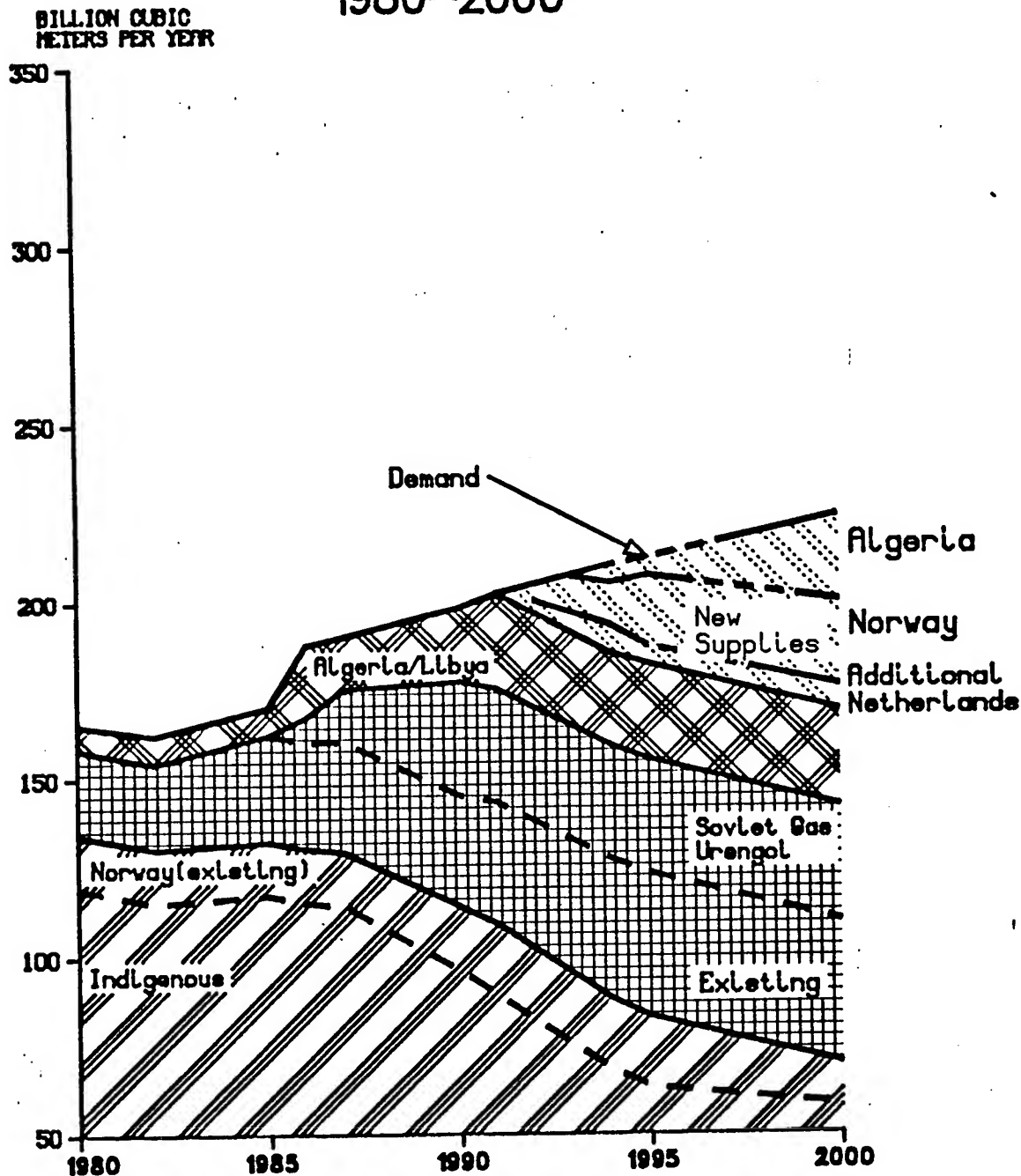
(Maximum Soviet Share, One Strand and  
Maximum use of Existing Capacity)

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- o Completion of the Siberian pipeline to the Czechoslovak border will add approximately 29 bcm of capacity to the probable current Soviet export capacity of 56-60 bcm, bringing the system's total export capacity to 85-89 bcm. After accounting for gas sales to East Germany and Western Europe including 20 bcm of Siberian gas, excess capacity of the Soviet-Czech system would total 22-26 bcm. If Italy decides to purchase 6-8 bcm of Siberian gas, the system's total excess capacity will drop to 16-18 bcm by 1990.
- o Expansion of the Czech domestic network in addition to the 29 bcm Siberian pipeline capacity would yield an excess capacity in the Czech system of about 11-13 bcm. (Italy's purchase of 6-8 bcm is factored into this calculation.)
- o With projected excess capacity on the order of 16-18 bcm, the Soviets could effectively capture an even larger share of the West European gas market in the 1990s. The Soviets could:
  - reduce the market for Troll gas to about 20 bcm. A reduction in the market for Troll gas could render field development uneconomical until the late 1990s.
  - or eliminate any North African projects such as Algerian gas, Nigerian or Cameroonian LNG.

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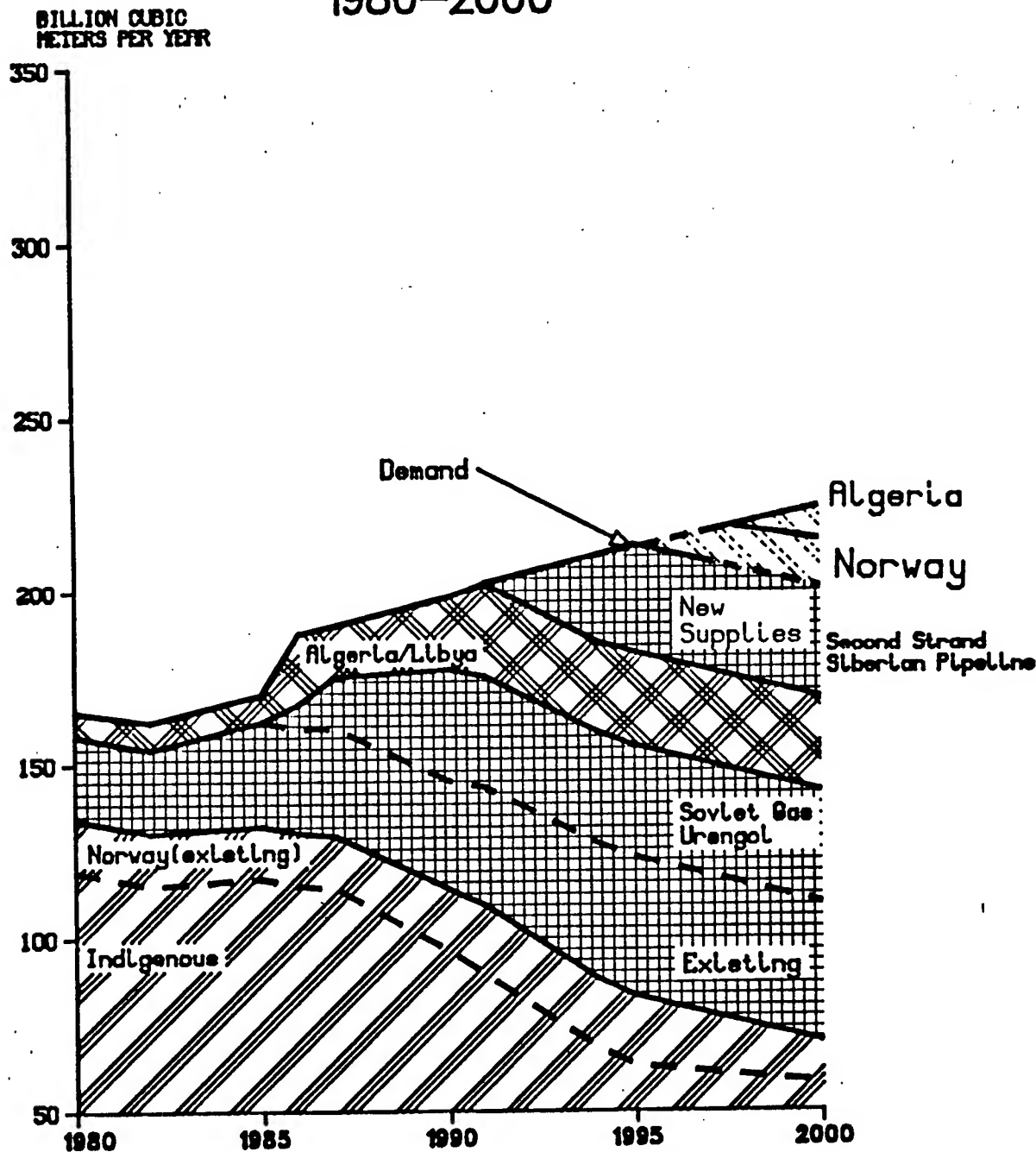
# Continental Europe: Natural Gas Supply and Demand Forecast 1980-2000



Case III:  
Maximum Utilization of Exleting  
and Planned Soviet Pipelines



# Continental Europe: Natural Gas Supply and Demand Forecast 1980-2000



Case IV:  
Second Strand of  
Siberian Pipeline